



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,012	07/21/2003	Bruce A. Nerad	58785US002	5742

32692 7590 11/05/2004

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER

MOUTTET, BLAISE L

ART UNIT PAPER NUMBER

2853

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/624,012	Applicant(s) NERAD ET AL.	
	Examiner Blaise L Mouttet	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-26, 36-46 and 49 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 6, 7, 11-14, 16-18, 27-30 and 32-34 is/are rejected.
- 7) ☒ Claim(s) 3-5, 8-10, 15, 19, 31, 35, 47 and 48 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/7/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The IDS submitted November 7, 2003 has been considered by the examiner.

Specification

2. The disclosure is objected to because of the following informalities:

On page 9, line 17 "carriage 46" should read --carriage 36-- in view of figure 1 and the earlier description.

Appropriate correction is required.

Claim Objections

3. Claims 8, 47 and 48 are objected to because of the following informalities in antecedent basis:

In claim 8 "the drive mechanism" lacks antecedent basis. This claim is seen to more properly depend from claim 3, which provides the appropriate antecedent basis. For purposes of examination under 35 USC 102 and 35 USC 103, claim 8 will be examined as dependent on claim 3.

In claim 47 "the number of activated lamps" should more properly read --a number of activated lamps-- since the radiation source was not previously specified as being in the form of plural lamps.

Art Unit: 2853

In claim 48 "the rate of pulsation of radiation lamps" should more properly read -- a rate of pulsation of radiation lamps-- since the radiation source was not previously specified as being in the form of plural lamps.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 6, 11-13 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Conwell et al. US 6,350,071.

Conwell et al. discloses, regarding claim 1, an inkjet printing apparatus (column 1, lines 43-45) for radiation curable ink comprising:

a support for receiving a substrate (4) (figure 1, while not specifically indicated it is implicitly necessary for the printer chassis to support the label substrates 4 relative to the printhead 2 as indicated by figure 1);

a printhead (2) for directing radiation curable ink toward a substrate (4) received on the support (3) (column 3, lines 41-43);

a source of radiation (5) for providing radiation (9) to ink received on the substrate (4) (column 3, lines 30-32);

a sensor (18) for sensing the amount of radiation emitted by the source of radiation (column 3, lines 4-8, column 4, lines 11-13); and

a controller having an input for receiving a signal from the sensor (18) and a characteristic of the ink, wherein the controller is connected to the source of radiation (5) and varies the amount of radiation delivered by the source of radiation (5) in accordance with the signal received by the sensor and the characteristic of the ink (column 2, line 67 – column 3, line 8, it is noted that while Conwell et al. does not make reference to a specific controller such a controller is implicitly necessary in order to accomplish the feedback control based on sensor 18 and the ink chemistry that is taught).

Regarding claim 2, the sensor (18) is laterally offset from the support since it is provided beneath the radiation source (5) (figure 4), which is downstream from and outside of the printer chassis that supports the substrate (4) during printing.

Regarding claim 6, the radiation is ultraviolet (column 3, lines 30-32).

Conwell et al. discloses, regarding claim 11, a method of inkjet printing (column 1, lines 43-45) comprising:

selecting a radiation curable ink (as noted in column 2, line 67 –column 3, line 3 several inks with different chemistries are considered useful in the printer, one of which is necessarily selected in order to perform to printing as taught);

selecting a substrate (4) (as noted in column 2, lines 51-56 several different substrates are considered useful in the printer, one of which is necessarily selected to perform printing as taught);

Art Unit: 2853

entering a characteristic of the ink into a controller (as explained in column 2, line 67 – column 3, line 8 control of current densities in pulsed xenon flash lamps is a function of ink chemistry which necessitates that information related to ink chemistry is entered into a controller for controlling the lamps);

directing the ink onto the substrate (column 3, lines 41-43);

activating a source of radiation (5) for providing radiation to ink received on the substrate (column 3, lines 28-31);

sensing the amount of radiation emitted by the source of radiation (column 4, lines 11-13); and

varying the amount of radiation delivered by the source of radiation in accordance with the sensed amount of radiation and a characteristic of the ink (column 2, line 67- column 3, line 8, column 4, lines 11-13).

Regarding claim 12, the radiation is ultraviolet (column 3, lines 30-32).

Regarding claim 13, the intensity (i.e. light energy) is varied based on the ink chemistry (column 2, line 67 – column 3, line 3).

Conwell et al. discloses, regarding claim 27, a method of inkjet printing (column 1, lines 43-45) comprising:

providing a substrate (4) (figure 1);

applying radiation curable ink to the substrate (column 3, lines 41-43);

directing radiation (9) along a first path and toward ink received on the substrate (4) (figure 1, column 3, lines 30-32, the first path comprises the path leading from lamp 5 to substrate 4);

Art Unit: 2853

directing radiation (9) along a second path and toward a radiation sensor (18) (figure 4, column 4, lines 11-13, the second path comprises the path leading from lamp 5 to the sensor 18, it is noted that while the second path and first path may intersect the claim does not exclude this possibility); and

varying the amount of radiation directed toward the ink in accordance with the amount of radiation detected by the sensor (19) (column 3, lines 4-8, column 4, lines 11-13).

Regarding claim 28, the radiation is ultraviolet (column 3, lines 30-32).

Regarding claim 29, the intensity of radiation is regulated dependent on the sensor (column 3, lines 4-5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Conwell et al. US 6,350,071 in view of Lund US 6,154,227.

Conwell et al. discloses, regarding claim 1, the inkjet printing apparatus as explained in the 35 USC 102 rejection above.

Conwell et al. fails to disclose that the controller receives inputs both of a characteristic of the substrate being printed on and the ink being printed.

Lund teaches an inkjet printer controller that receives inputs of a characteristic of the substrate being printed on and the ink being printed (104-110, figure 1) in order to facilitate printing (column 3, lines 9-20).

It would have been obvious for a person of ordinary skill in the inkjet art at the time of the invention to have the controller of Conwell et al. receive inputs both of a characteristic of the substrate being printed on and the ink being printed as taught by Lund.

The motivation for doing so would have been to facilitate printing as taught by column 3, lines 9-20 of Lund.

6. Claims 14, 18, 30, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conwell et al. US 6,350,071 in view of Tanigawa JP 2020015A.

Conwell et al. discloses, regarding claims 11 and 27, a method of printing as explained in the 35 USC 102 rejection above in which the intensity of radiation from the UV source is varied based on ink chemistry and sensor feedback. The control is described to be performed by shifting current densities (column 2, line 67- column 3, line 8).

Conwell et al. is silent as to the specifics of how the shifting current densities is achieved and fails to disclose that the act of varying the radiation intensity of the UV lamp is achieved by altering a voltage supply or a rate of pulsation of the lamp.

Tanigawa is pertinent to intensity sensor feedback control of a UV lamp source used in curing. While directed to the field of semiconductor wafer processing a person of ordinary skill in the inkjet art with knowledge of the teachings of Conwell et al. would have sought out all teachings relevant to UV lamp intensity sensor feedback control since this is critical to the invention of Conwell et al. Tanigawa teaches that such control is achieved by providing a frequency/voltage varying unit (6) (abstract).

It would have been obvious to a person of ordinary skill in the inkjet art at the time of the invention to use frequency/voltage control as taught by Tanigawa in the feedback control of Conwell et al.

The motivation for doing so would have been to perform a well-controlled regulation of the lamp as taught by Tanigawa.

7. Claims 16 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conwell et al. US 6,350,071 in view of Richmond US 4,033,263.

Art Unit: 2853

Conwell et al. discloses, regarding claims 11 and 27, a method of printing as explained in the 35 USC 102 rejection above in which the intensity of radiation from the UV source is varied based on ink chemistry and sensor feedback. The control is described to be performed by shifting current densities (column 2, line 67- column 3, line 8).

Conwell et al. fails to disclose that varying the amount of radiation is achieved by varying the relative rate of passage between the source or radiation and the substrate.

Richmond discloses a printer that utilizes ultraviolet curing of ink and feedback control of the intensity of the UV source via sensor (7). Richmond also discloses varying the amount of radiation by varying the relative rate of passage of the source of radiation and the substrate (12) to be cured in response to the sensor (7) (column 7, lines 50-65).

It would have been obvious to a person of ordinary skill in the printing art at the time of the invention to vary the relative rate of passage of the substrates (4) in the printer of Conwell et al. in response to the sensor (18) as taught by Richmond in order to vary the amount of the UV radiation applied to the substrates per unit time.

The motivation for doing so would have been to continue printing and drying properly even after aging of the lamp as indicated by column 7, lines 50-65 of Richmond.

Additional Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Knight US 5,722,761 discloses a moving mechanism for moving a filter between a path of radiation from a UV ink curing device used in printing.

Nakajima US 2003/0222961 A1 discloses a movable mirror for directing radiation along a print path to cure printed ink.

Hu et al. WO 01/83223 A1 discloses a scanning radiation source (30) used in curing ink and sensors (162a, 162b) used in sensing the position of the radiation source that are laterally offset from the substrate on which the ink is cured. The sensors (162a, 162b) are not taught to detect the intensity of the radiation source.

Tokuda et al. JP 404341374A teaches varying the number of curing lamps used depending on the shape/size of the object being cured. No feedback control based on a sensor is taught.

Allowable Subject Matter

9. Claims 20-26, 36-46 and 49 are allowable.

Claims 47 and 48 are allowable provided the above noted objection is corrected.

Claims 3-5, 8-10, 15, 17, 19, 31, 33 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding the indicated allowability of claims 20-26 and 36-49 while the prior art shows an intensity sensor used in feedback control in radiation curing of ink in an inkjet

Art Unit: 2853

printer (Conwell et al. '071) the sensor is held fixed relative to the radiation source.

Means for directing, or a drive mechanism for moving, a radiation source from a first path adjacent a substrate to a second path adjacent a sensor is disclosed by Hu et al.

'223, however the sensors of Hu et al. are not used in detecting the radiation intensity or amount and are instead taught to be positional sensors such as proximity switches or photo sensors for detecting the position of the means for moving the radiation source (page 10, lines 14-16). There is not seen to be a reasonable motivation for a person of ordinary skill in the art to combine these teachings to obtain claims 20-26 or 36-49 as currently presented given the prior art of record.

Regarding claims 3-5 and 8-10, the further specifications involving drive mechanism(s) for moving the radiation source are non-obvious in combination given the art of record for reasons similar to that given above.

Regarding claims 15 and 31, varying the amount of radiation from an ink curing device by moving a filter to intersect the radiation was known to the prior art in order to distinguish ultraviolet from infrared radiation (Knight '761). However sensor feedback is not used by Knight '761 and there is not seen to be a reasonable motivation for a person of ordinary skill in the art to combine this teaching with that claimed in claims 11 or 27 to arrive at the claimed invention.

Regarding claims 17 and 33, varying the amount of radiation from a curing device by varying the number of lamps in accordance with the size of an object to be cured was known to the prior art (Tokuda et al. '374). However this is not used in feedback control with a sensor and there is not seen to be a reasonable motivation for a

Art Unit: 2853

person of ordinary skill in the art to combine this teaching with that claimed in claims 11 or 27 to arrive at the claimed invention.

Regarding claims 19 and 35, varying the amount of radiation from an ink curing device by changing the distance between the source of radiation and a substrate was known to the prior art in order to cure ink images printed with different printing parameters (Ylitalo WO 02/053382, page 10, lines 5-11). However Ylitalo '382 does not employ radiation sensing and there is not seen to be a reasonable motivation for a person of ordinary skill in the art to combine this teaching with that claimed in claims 11 or 27 to arrive at the claimed invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet who may be reached at telephone number (571) 272-2150. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier, Art Unit 2853, can be reached at (571) 272-2149. The fax

Art Unit: 2853

phone number for the organization where this application or proceeding is assigned is
(703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or
proceeding should be directed to the receptionist whose telephone number is (703) 308-
0956.

Blaise Mouttet November 3, 2004

Blaise Mouttet 11/3/2004